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East Europe Report

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No. 743

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CONTENTS

RESEARCH PLAN TO INCLUDE MEDICAL BIOLOGICAL DIAGNOSTIC PREPARATIONS

Budapest NEPSZABADSAG in Hungarian 30 Apr 82 p 4

[Text] At the recommendation of the Science Policy Committee, the government has decided to include research, preparation and introduction of medical-biological diagnostic products in its medium-term R&D plan which runs from 1981-1985.

The vast achievements of research in molecular biology, biochemistry and immunology over the past decade have given medical science new tools for diagnosis and treatment of ailments. Consequently, a branch of pharmo-chemistry has sprung up in countries where medical science is well developed and where there is an appropriate pharmaceutical industry to back it up. This branch produces preparations for diagnosing and treating ailments from human and animal cells and blood plasma. The products are used primarily in treatment of infectious viral diseases, tumors, haematological and endocrinological diseases, birth and development defects and in tissue and organ transplants.

In Hungary, production of such preparations has been begun in limited quantities only, and substantial imports are needed. However, it is the general opinion that the requisite knowledge and expertise for making these products are available at home. Given target-oriented research utilization, refinement of domestic results and broader research, domestic preparations suitable for clinical use could be produced within a short period.

The new program is broken down into three subprograms: the first calls for production of special blood preparations--diagnostics, prophylactics, therapeutic preparations. The second involves evolution of so-called lipsosome preparations. In these preparations, lipids are encased in microcapsules which alter their pharmacological character and effects. They can be tagged to act in specific areas. The third subprogram is aimed at development of radioactive preparations.

The research program and the more broadly based production plans are to utilize the existing institutions of the Ministry of Health, namely, the Institute of Haematology, the National Blood Bank Enterprise, the Human Vaccine Producing and Research Institute, the Isotope Institute of the Hungarian Academy of Sciences, the regional isotope laboratory network and the operations of the pharmaceutical enterprises.

CSO: 2502/74

ONBOARD COMPUTER OF MALEV PLANES

Budapest INFORMACIO ELEKTRONIKA No 1, 82 pp 56-58

[Article by Laszlo Ujlaki: "The Onboard Navigational Computer of MALEV Planes"]

[Text] This article allows us to become more familiar with a special application of computer technology. The application--so far as the profile of our magazine is concerned--is a border area. The article is published in view of the high level of interest, the special and interesting nature and the significance of the application. (The Editorial Staff)

The navigation of planes traveling on high-traffic routes is assured by many radio devices, which indicate the direction to be followed, the remaining distance to be covered, etc. Flying over oceans, deserts, sparsely populated areas, however, the pilot can rely only on data directly measurable on board. The processing of this information, not directly usable for navigation, is performed by the onboard navigational computer. The operation of such a piece of equipment--in service onboard MALEV planes--is described in the following.

On the most modern MALEV planes, an analog-digital-system navigational destination computer is used. Its task is to determine and display the position of the plane and assure via the guidance system that the plane stays on the designated course, especially when following routes poorly serviced by terrestial navigational aids.

The determination of the position of the plane is achieved by the real-time integration of the momentary flight speed (ground speed, or course speed, i.e., speed registered relative to the surface of the earth). The speed is sensed by the Doppler radar of the plane, and the momentary flight direction --the geographical direction of the longitudinal axis of the plane--by the guidance system of the plane; the latter is a gyrocompass corrected by a magnetic directional angle.

The navigational computer uses the so-called fractional orthodromic coordinate system. This is a right-angle system, which is usually along a

short and straignt section of the course. Axis S coincides with the course, and axis Z is perpendicular to it. The origin of the coordinate system is at the end of the course section.

Fractional orthodromy is defined by two parameters: the course angle--the angle between the given course section, i.e., axis S, and the direction of the north pole--and the length of the section.

In the example shown in Figure 1, the plane traveling from point A to point B is flying along the fractional orthodromy which may be characterized by course angle TC (true course) and distance AB; distance s and lateral drift z are its coordinates. The next course section, of course, has a different fractional orthodromy.

The navigational computer calculates the momentary coordinates of the plane based on the system of equations below:

$$s = s_o - \int_{t_i}^{t_{i+1}} w_s \, dt;$$

$$z = z_o \int_{t_i}^{t_{i+1}} w_z \, dt;$$

where:

s_o, z_o are the coordinates of the plane at initial time t_i,

w_s, w_z, and S and Z components of the course speed

and

t_i, t_{i+1}, the initial and final time of the flight completed along the i-th fractional orthodromy.

The most important navigational parameters can be seen in Figure 2.

Let us note that the direction of vector w of the course speed does not coincide with the longitudinal axis of the plane, since wind of speed vector u shifts the plane by the value of wind drift angle DA (Figure 3).

The output signal of the Doppler radar contains information relative to both course speed w and wind drift angle DA. The doppler frequency generated by the device--disregarding wind drift for the moment--is directly proportionate to the course speed:

$$f = k \cdot w,$$

where k is a constant characteristic to the device.

The determination of the distance covered by the plane can be practically reduced to pulse counting:

$$I = \int_{t_1}^{t_2} w dt = \int_{t_2}^{t_2} f/k \, dt - n/k,$$

where n is the pulse count of the doppler frequency during registration time $t_2 - t_1$.

In reality, the situation is more complicated. In order to take into account wind drift, the Doppler radar simultaneously generates three frequencies. Since the frequencies are proportionate to the course speed and the wind drift angle, using the model of the S and Z components of the speed, the concept of the pulse count components can be introduced by applying the similar model of the s and z components of the displacement. Finally--taking into account that the individual Doppler frequency radiation directions are different--the determination of the speed components is done based on the following system of equations:

$$\begin{aligned} w_s &= k_1 (f_1 + f_2) \cos (TH - TC) + \\ &+ k_2 (f_2 - f_3) \sin (TH - TC); \\ w_z &= k_1 (f_1 + f_2) \sin (TH - TC) + \\ &\quad k_2 (f_3 - f_2) \cos (TH - TC) \end{aligned}$$

where

k_1, k_2 are constants characteristic to the Doppler radar, TH - TC, the difference between the momentary direction angle and the course angle of the plane

and

f_1, f_2, f_3, the three Doppler frequencies.

The displacement components--i.e., the fractional orthodonic components--can be determined by its integral:

$$\begin{aligned} s &= k_1 (n_1 + n_2) \cos (TH - TC) + \\ &+ k_2 (n_2 - n_3) \sin (TH - TC); \\ z &= k_1 (n_1 + n_2) \sin (TH - TC) + \\ &\quad k_2 (n_3 + n_2) \cos (TH - TC), \end{aligned}$$

where n_1, n_2, n_3 are the numbers of three Doppler frequency pulses during the time of registration.

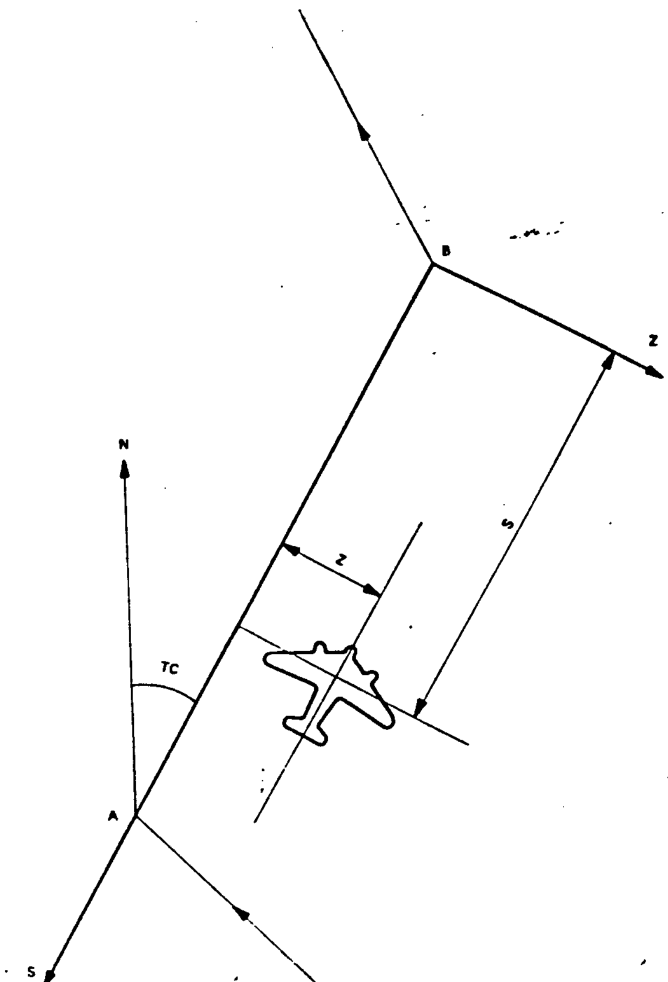
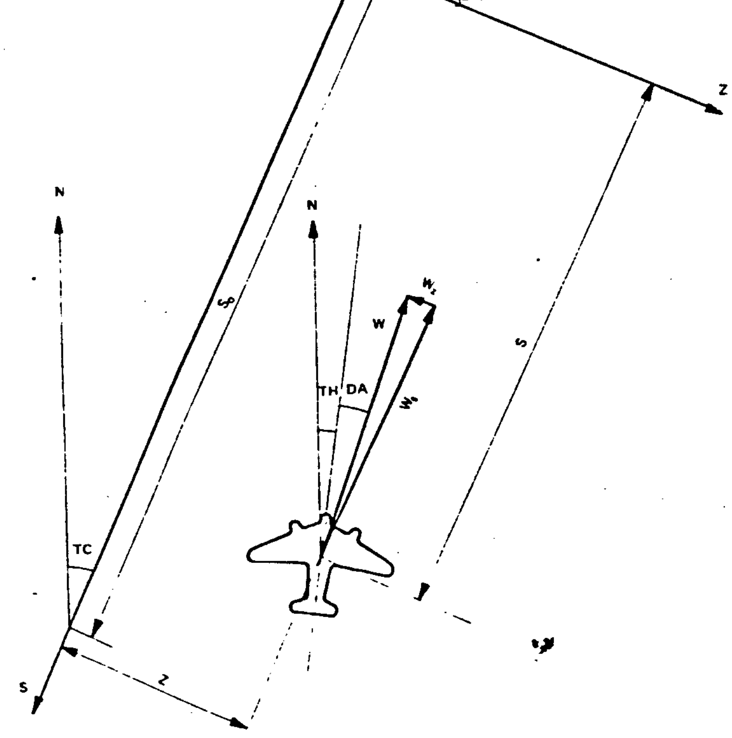


Fig.1. The determination of the position of the plane in the orthodromic coordinate system.

Fig. 2 The major navigational parameters.



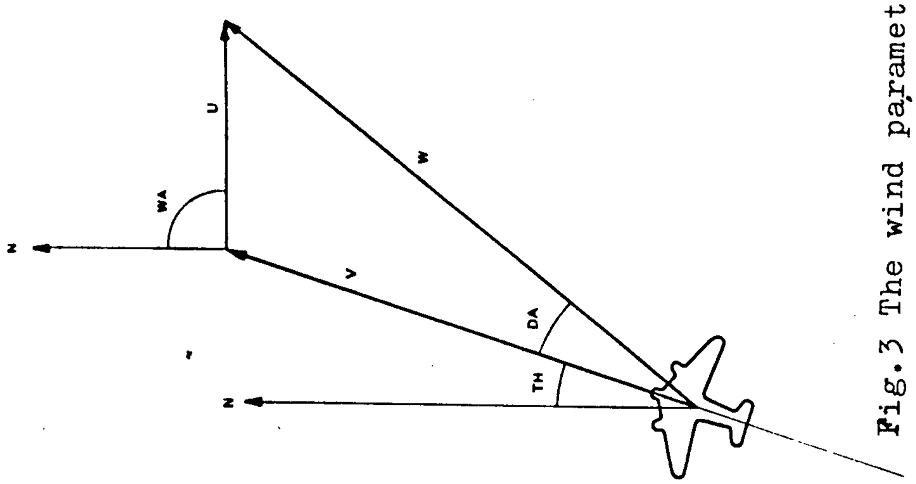


Fig.3 The wind parameters.

Course angle TC set on the instrument panel of the navigational computer and direction angle TH coming from the guidance system are processed as analog signals by the equipment; the two signals are accepted by alternating-current servocircuits.

The sine and cosine values of the analog signal are produced by revolving transformers.

The alternating-current sine and cosine signals are converted to digital code by an A/D converter. The multiplication of the Doppler frequency by the sine and cosine values is performed by a pulse multiplier. The pulses are counted and summed up by stepping motors. This design assures information protection even in case of power failure. Via a corresponding reducer, the axle of the stepping motors drive a counter which displays the momentary values of coordinates s and z in kilometers.

The equipment contains two identically built computer units. One is always active calculating and indicating the momentary coordinate; in the meantime, on the other unit, the parameters of the next fractional orthodromy can be set by means of the operating organ.

When the value of coordinate s, displayed by the active unit, is approximately zero, the equipment automatically reverses the role of the units: the hitherto passive unit becomes active and continues the calculation of the coordinates. It accepts as an initial value the value displayed by the other unit at the instant of the switchover, after recomputing it according to its own fractional orthodromy. The other unit is freed and the next fractional orthodromy may be set on it.

The value of the distance causing the switchover can be programmed in advance (we shall immediately see the importance of this). The switchover can be effected by an emergency switch any time.

The equipment--in addition to its function as an indicator--can also be used for the direct control of the plane. Lateral drift z and its first derivative transmitted as an analog signal (direct voltage) by the equipment is fed to the input of the automatic control system (commonly, but inaccurately, known as the automatic pilot) of the plane. In its corresponding operating mode, the automatic control system performs a maneuver to reduce the value of coordinate z, by manipulating the rudder surfaces of the plane.

When the orthodromic distance is properly selected, the plane assumes its new course section with a mild turn.

The operation described above is that of the basic operating mode. Navigational computers, however, have an emergency operating mode: because under certain circumstances (especially while the plane is maneuvering), the Doppler radar does not supply reliable information. In such a case, it generates an inhibit signal which is used by the navigational computer to set the emergency operating mode.

The typical feature of this emergency operating mode is that it uses the information recorded prior to the moment of its activation. The navigational computer continuously receives information on the true air speed of the plane; this is the properly corrected speed of the movement of the plane relative to the surrounding air mass, measured by aerodynamic methods. Comparing the values of the true air speed to the signal of the directional system and the signal of the Doppler radar, speed u of the wind and the direction of wind angle (WA) can be determined (Figure 3). These two parameters are recorded by the analog storage at the instant when the switchover to the emergency operating mode occurred--reversing the former method--the missing information of the Doppler radar can be determined. Thus position determination can continue. In the emergency operating mode, of course, it is not possible to take into account the changes of the wind parameter in time and space; as a result, accuracy is reduced.

When the navigational computer is used, the length and course angle of each course section must be established based on air navigation charts during the preparation phase of the flight.

Prior to takeoff, the navigational personnel sets the parameters of the first two course sections. Following takeoff, the computation can be activated by the hitherto frozen parameters when flying over the starting point of the first section. After changing over to the second course section, the parameters of the third section can be set, and so on.

In some designs of navigational computers, the calculated coordinates can be modified based on the signals of the radio navigation system. This is important when the plane is flying outside the effective range of terrestial radio navigation aids for a long period of time. In this case, the mistakes accumulated during the integrations taking place over the long time period can be eliminated.

In closing, let us note that technical advancements are manifested in this area as well: on the next generation of planes, a fully digital-system navigational computer is used, which, among other things, allows the programming of the entire course in advance.

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CSO: 2502/69

PROCESS - 2000 VIDEOTON NETWORK SYSTEM DESCRIBED

Budapest INFORMACIO ELEKTRONIKA in Hungarian No 6, 81 pp 335-337

[Article by Zsigmond Racz, instructor at SZAMOK [Computer Technology Training Center], and Istvan Simon, staff scientist at SZAMKI [Computer Technology Research Institute]

[Text] Our paper describes the communication-control operating system of a packet switching network. It describes the conditions of realization, the system environment, and the currently operating realization of the PROCESS-200 operating system. The first part of the paper describes general considerations; thus it is likely to be of interest to a relatively broad circle of computer-technology experts. The second part, containing information concerning details of the realization, is recommended for practitioners of operating systems.

(Manuscript received 1 March 1981)

PROCESS-2000 is the operating system of the nodal-point computers of the Videoton Network System (VNS), developed jointly by Videoton and SZAMKI. The VNS, the separate message-packet switched system of Videoton, can be divided into two main parts, namely the application environment and the communications environment.

The following are the tasks of PROCESS-2000:

- Clocking the independent processes of the communications environment;
- Solving the coordination problems resulting from concurrent cooperation;
- Clocking the resources;
- Handling the series related to message handling; and
- Ensuring the effective operation of the entire communications subnetwork (Network System Support - NSS).

In developing the operating system, we started from the standard Videoton monitor RTDM. We made certain changes but retained its input, output, and clocking system, as well as certain monitoring program sectors and immediate tasks which are essential for the operation of the system.

For the operating system we received the DTM60 periphery handler from Videoton. This handler physically handles the AMC and the asynchronous lines. The VTDLC periphery handler handles the synchronous lines which connect the individual nodal-point computers. This handler was also developed by Videoton. The VTDLC, same as other layers of the NSS, were inserted into the PROCESS-2000 operating system as immediate tasks at generation. A special momitoring program sector, inserting and monitoring the programs, supported the work of the network developers. The Structured Macro Set (SMS), which is based on the macroassembler of the VT60 and which was developed by staff members of SZAMKI, made the designing convenient and contributed to the effectiveness of the insertion.

General Description of the VNS

The VNS is a network of Videoton. Its aim is to support the divided resource management system of the enterprise. The following are the components of the resource management system:

- Handling the parts catalog;
- Handling the orders;
- Programming the manufacture; and
- Handling the warehouse stock.

Because of the divided character of the system, the data-processing functions are connected by a data-communication function. Accordingly, the VNS system can be divided into two main parts: the application subsystem and the communications subsystem.

Videoton developed the application system which performs the above functions. The communications subsystem was developed jointly by Videoton and SZAMKI.

The physical network consists of ESER 1010, ESER 1012, or ESER 1010M (VT60) type data-processing computers, which are located away from each other, and the ESER 1010M computers, which represent a communications subsystem providing intercommunication between them. The host-node connection is via AMC; the node-node connection is realized over 9600 bit/sec synchronous lines. The interactive VDT terminals are connected to the nodal points via 600/1200 bit/sec asynchronous lines.

Figure 1 illustrates the hardware/software architecture of the VNS. The VNS is amessage-packet switched network of layered design, following the recommendations of the Open Structure Architecture. The layer layout is shown in Fig. 2.

Numerous documents and publications are already available on the operation of the VNS network and the individual layers. The most important ones are listed in the bibliography.

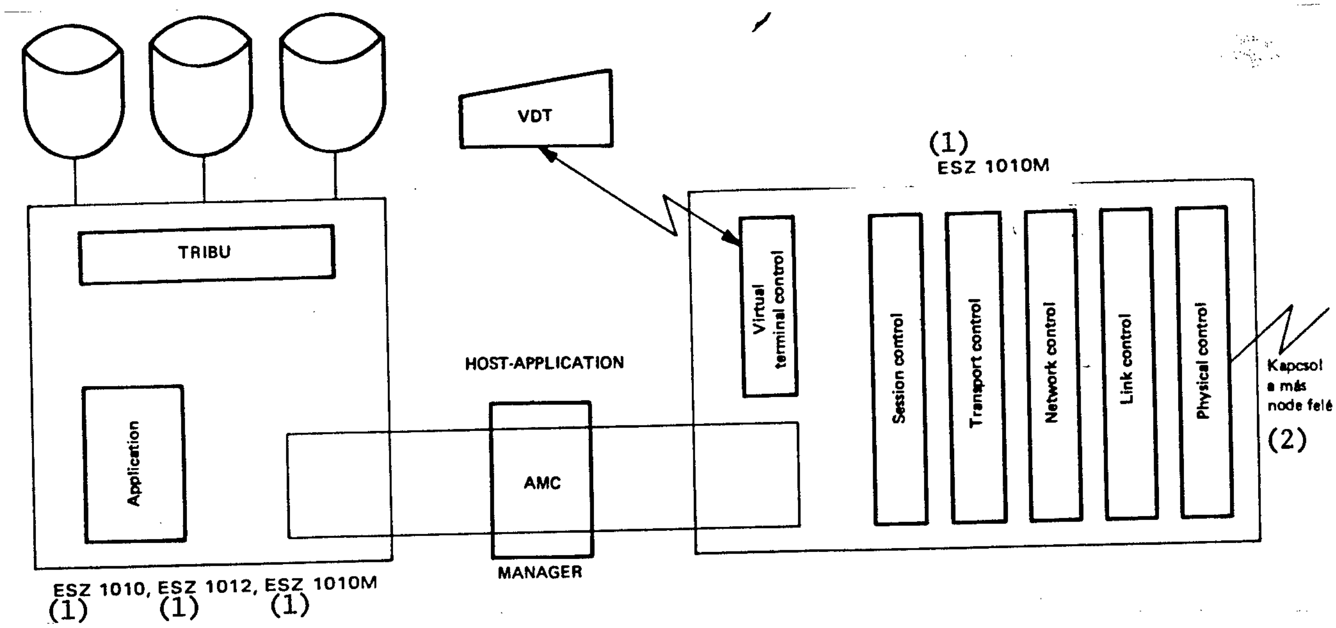

Fig. 1. The layered structure of the VNS

Key: 1. ESER
2. Switches to other node

The VT60 (ESER 1010M) Computer

Architecture

The VT60 computer is the small computer of Videoton, compatible with ESER 1010/ESER 1012.
Its memory capacity is 64 kbyte for programs and, selectably, 64 kbyte for data.
Its word length is 16 bits plus a memory-protection bit.

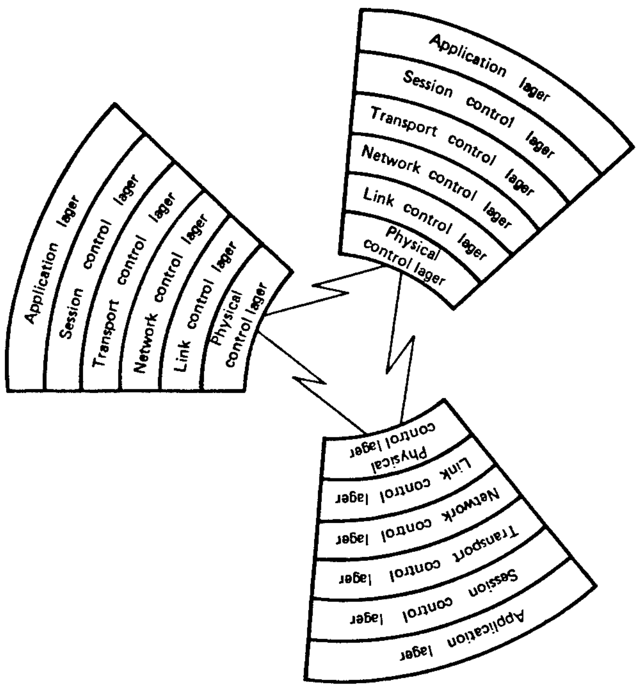

Fig. 2. Hardware/software architecture of the VNS
[The word "lager" should read "layer"]

Number of interrupt levels: 31 or 64, plus background.
A base-register addressing mechanism ensures the modularity of the programs running on the computer and provides program protection. The I/O system ensures the maximum overlap of the central-processor operations and the input/output operations, and thus provides high-speed system operation.

There is a real-time clock in the computer, which performs the time-handling operations , which are important in the divided system.

Above the level of the physical input/output handling, the VT60 is fully compatible with the ESER 1010/ESER 1012 computers, and, with its new commands (especially the bit-handling commands), offers the possibility of more effective organization of the programs.

Many peripheral devices, for example devices enabling remote handling and computer-to-computer connection, can be connected to the VT60. All these factors make the VT60 particularly useful for handling real-time tasks or for use as front-end processors for no less divided large computer systems. They also make it useful as a communications handler or as an intelligent terminal.

In the VNS network, the VT60 performs the role of communications handler, but theoretically it could also serve as resource computer.

Standard Monitors

Videoton offers a wide range of software -- operating systems, data-set handling systems, standard processors -- for the VT60 computer. There are three types of operating system:

- Disk Basic Monitor (DBM);
- Real-Time Disk Monitor (RTDM); and
- Multitask Monitor (MTM).

The DBM, as its name already indicates, supports the batch operating mode; basically, it is recommended for program-development and data-processing jobs.

The RTDM monitor is a memory-resident operating system, which permits real-time multiprogramming and time handling. There is no need for a system disk for the user system resident in the memory operating under the RTDM monitor.

The MTM is a fixed-partition multiprogramming operating system, which offers means for the transfer of the momentarily not activatable user tasks to the system disk (swapping) and thus for major "virtual" increase of the actual physical central memory. This operating system necessitates a system disk.

The operating systems listed above contain no data-set handling system. There are three different data-set handling system available in the VT60 computer:

- Direct;
- Sequential; and
- Index-sequential.

In the DBMF, RTDMF, and MTMF operating systems there are means for using the direct and sequential data-set handling mode.

The DBMI, RTDMI, and MTMI operating systems are additionally also capable of handling index-sequential data sets.

The DMS60 data-base handling system enables the handling, the interrogation, and updating of the data bases.

Reasons for Creating PROCESS-2000

The wide range of uses to which the Videoton standard monitors can be put is demonstrated by many systems. It is not surprising that there would be people who question the need for the development of an additional operating system.

The VNS packet-switched network imposes entirely new demands on the operating system, partly because the functions, which differ fundamentally from those of conventional systems, and partly because of the configuration of the layer-layer (more accurately process-process) system, which meets the international standards.

Let us review the reasons which excluded the application of the individual standard operating systems.

The configuration of the nodal-point computers of the VNS contain no magnetic disk unit for reasons of economy. This excludes the possibility of using the MTM and the data-set handling monitors. It should be noted that there is actually no need for the latter since the data sets required for the nodal-point operations are not required; their handling would have considerably slowed down the system.

The nodal-point software consists of parallel (pseudoparallel) operating processes, of which the task is to handle the stochastically occurring events. This requires a high degree of multiprogramming, and this already excludes the use of the DBM monitor.

This leaves the RDTM, but not for very long. As we have already mentioned, the VNS (and the NSS within it) is a software system of layered configuration, following the concept of the Open System Architecture.

Information exchange among the layers and within the units of layers takes place by transmission and reception of message packets. This mode coordinates the processes too in the present version, although this was not always the most economical approach.

Conditions for the transmission and reception of messages are mailbox type handling, dynamic buffer handling, and sequential handling at the level of the operating system.

The RTDM lacks these functions; however, it has numerous operations which are entirely unnecessary for the application involved. It was therefore necessary to incorporate the lacking operations and to free the memory space occupied by the codes of the superfluous features. We started out from an RTDM operating system and gradually added the new sections, and adapted the remaining functions (data entry and removal, time handling) to the new system concept. Finally, we eliminated the unnecessary monitoring program sections from the system. This is how the PROCESS-2000 operating system evolved.

Part II of the article will contain the description of the architecture of the operating system and some details of interest concerning its realization.

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CSO: 2502

CENTRAL COMPUTER DEVELOPMENT PROGRAM FOR SIXTH FIVE YEAR PLAN

Budapest SZAMITASTECHNIKA in Hungarian Dec 81 pp 2, 3

[Article by Dr Lajos Varga: "The Central Computer Development Program in the Sixth Five-Year Plan Period"]

[Text] In April of this year the Council of Ministers passed a resolution concerning the tasks and pace of the Central Computer Development Program (SZKFP) in the Sixth Five-Year Plan period. We reported on the chief characteristics of the program in our May issue. The resolution of the Council of Ministers prescribed that a report should be prepared for the State Plan Committee (ATB) concerning the tasks of carrying out the SZKFP, taking into consideration the 5-year plans of the managing organizations (enterprises and cooperatives), the preparation of which was due in June of this year. The ATB discussed and accepted this report at the beginning of November. (In this article we will deal with questions of applications; we will write in a later issue about plans and tasks of domestic computer technology manufacture.)

The chief requirements made of the program, in harmony with what is contained in the Sixth Five-Year Plan of the People's Economy, are the following.

The emphasis of the program should be applications of computer technology and the level of computer technology services should improve. In regard to the devices used the ratio of domestic and socialist import computers should increase. Use of the tools should expand primarily in areas directly supporting economic policy goals, especially in the areas of enterprise management and production guidance and the automation of technological processes.

The harmonization of systems must be increased in state administrative computer technology applications, keeping in mind efficiency requirements in a far-reaching way.

Research and development, manufacturing and specialist training should develop in harmony with domestic needs and international obligations.

The concrete program of the SZKFP contains a series of coordinated tasks and measures--designating those responsible and time limits--with the execution of which the above outlined chief requirements made of the program can be realized. Thus:

--building computer technology into social and economic processes will continue in a coordinated way,

--the level of computer technology applications will increase,

--the efficiency of the use of the available technical and intellectual resources will increase, and

--participation at every level of execution will be more active and more purposeful than earlier.

On the basis of the achievements of the SZKFP thus far computer technology applications extend potentially to every area of social and economic life; thus every organization of the economy is affected by it, although their interest necessarily differs in regard to the degree of use and changes with time. It has been proven that the efficient use of computer technology is a very important, recognized tool for the intensive development of the economy and an unfolding of innovative processes. It aids the planning of economic processes, the flexible guidance of them adjusting to internal and external conditions, the taking into account of results and an evaluation of developmental trends.

The program includes a number of measures for developing applications and raising their level. The most important tasks in state administration are:

--the development of cooperation among central information systems--planning, financial, statistical and labor affairs,

--the development of administrative and guidance information systems for economic ministries and organs with national authority,

--the development and rational coordination of basic national records--population records, real estate records, regulations and highway vehicle records--taking into consideration the possibilities of a regional division of labor, and

--the modernization of council administrative information systems with increased use of the possibilities of computer technology.

These information systems occupy an eminent position among state administrative applications and the program will turn the resources available primarily to a coordinated development of these systems. An important task awaits the information supplying organizations of the OT [National Plan Office], the KSH [Central Statistics Office], the PM [Ministry of Finance] and the ABMH [expansion unknown] which, supported by the State Administrative Informatics Development Society, must see, during the plan period, to the substantive and logical harmonization of the data bases of the affected organizations and then

create, by the end of the plan period, a coordinated national economic computer data base system. An important element in the activity of the society will be the development of broader cooperation in the interest of more efficient use of certain data bases of other information systems, of outstanding importance from the viewpoint of the national economy, avoiding the creation of superfluous capacity, primarily cooperation with the information supplying organizations of the MNB [Hungarian National Bank], the OAAH [National Material and Price Office], the KKM [Ministry of Foreign Trade] and the Ministry of Industry.

Another stressed area for developments financed from the budget is the computerization of education. This is illustrated by the fact that the share of education is about one quarter of the available budgetary investment resources. Gradually making the teaching of computer technology applications general even in secondary education is indispensable for raising the general level of application information, laying a foundation for the computer technology information of later potential users and realizing our long range economic development policy. The program considers it possible to lay the foundations for this by making available micro-and minicomputers.

In regard to the capacity needed for higher education one should think not only of new investments and reconstruction but also of the organized inclusion of the resources of computer technology systems operating in state administration and certain service organizations. In creating the conditions the program counts on the creative initiative and cooperation of organizations having appropriate tools and possibilities. An important role will also fall to study courses offering general applications information to leaders.

The application of computer technology will have an unambiguously important role, though to a differing degree, in the sixth 5-year plans of management organizations--in the interest of achieving the national economic goals. An aspiration has been formulated in the plans to gradually integrate computerized solutions for management and guidance, technical design automation and technological process control into a common system. Some of the applications plans will aid directly the execution of developmental programs approved in the national economic plan also. For example, the OKGT [National Oil and Gas Industry Trust], the coal mines and the MVMT [Hungarian Electric Works Trust] will support the energy management program; the MAT [Hungarian Electric Works Trust] will support the aluminum industry program; the pharmaceutical industry and chemical industry enterprises will support the pharmaceuticals, crop protection materials and intermediaries program; and the significant development of chemical industry enterprises coordinated by the Chemical Industry Computer Technology Development Association will support the petrochemical program. Two large enterprises of domestic computer technology manufacture, Videoton and the Telephone Factory, also have computer technology applications plans embracing their guidance and management systems.

Important computer technology tasks have been forumlated in the transportation and communications branch, the execution of which will contribute to the efficient use of significant economic resources in rail and highway transportation the MAV [Hungarian State Railways] and VOLAN. Among the

applications intended to improve the management of the Hungarian Posts the computerization of the check accounting system serving to accelerate financial transactions is of outstanding significance.

Substantial developments are represented by the computer technology plans of those large industrial enterprises which will have the conditions for swifter economic development or which carry out significant production and export tasks (for example, Ikarus, Taurus, the Paper Industry Enterprise, the Danube Iron Works and the Alba Regia Construction Industry Enterprise) and of a few organizations of agriculture and the food industry.

The role of stockpiling enterprises is increasing in keeping track on a daily basis of the location of the most important economic stockpiles and of the flow of materials. In the interest of increasing the operational nature of this information four significant TEK [Capital Equipment Marketing] enterprises (AUTOKER [the Auto and Spare Parts Trade Enterprise], FERROGLOBUS, VEGYTEK and ELEKTROMODUL) are planning the use of modern data processing and business systems which will constitute the basis for a national economic stockpiles information system.

The development of the computer technology systems of financial institutions--the systems of the OTP [National Saving Bank] and the AB [State Insurance Enterprise] (deposit accounts, check writing by the populace, vehicle insurance and paying for damages)--and of the AFIT [Industrial Trust for Auto Maintenance] will contribute directly to raising the level of services to the populace. Rational management of hotel and other lodgings is a significant factor in the development of our tourism.

The goals and the tasks to be solved are differentiated to a great degree in the several user organizations. About 30 significant computer technology development projects linked to national economic goals have been developed and these are supported by detailed plans. About 250 management organizations (enterprises, trusts, trust enterprises, member enterprises of associations, state farms, etc.) are directly affected by the realization of these projects.

In these projects they plan the creation of integrated guidance and management information systems, devoting a stressed role to operational production guidance. Almost every plan is based on making use of remote processing, thus increasing the operational character required by adaptation to the environment and aiding the availability of the information needed to guide multiple-site large enterprises and farms in accordance with the needs of production, stockpiling and transportation. About one third of the plans count to a significant degree on bringing in institutions providing computer technology services. Central and branch research and development programs will aid the realization of some developments also.

In harmony with the national economic planning system the program does not regard as closed the sphere of organizations realizing the above mentioned projects. It assumes that in the course of executing the plan the possibilities and goals may change at some organizations. Thus our computer technology developments will be modified or diverted from them while at other organizations computer technology may be given an emphatically important role in the course of the plan period.

Creating receptivity at the user organizations is a basic condition for efficient use of computer technology. The program will continue to turn great care to watching and influencing this, weighing the possibilities of the national economy. We are talking about receptivity in a double sense. On the one hand it means a correct judgment or evaluation of the ability of the organization to accept a system. This must be solved primarily by the supreme leadership of the organization. On the other hand it means ensuring the conditions to accept a concrete computer technology system, which is more the task of the technical leadership. The activity of institutions providing computer technology services is crucial in creating receptivity.

The development of the system of institutions providing computer technology services is of crucial importance in carrying out the tasks of the organizations using computer technology. They provide intellectual and machine capacity for the organizations turning to them; by the second half of the Sixth Five Year Plan it is expected that this will be done via remote data processing links also. They take part in systems development and cooperate in their introduction and in preparing the organizations. The organizations offering an applications development service occupy a leading place among those providing services. As of 1 January 1982 the KSH will have created the Computer Technology Applications Enterprises (SZAMALK) on the intellectual and machine base of the SZAMOK [Computer Technology Training Center], SZAMKI [Computer Technology Research Institute] and OSZV [National Computer Technology Enterprise] institutions, to carry out national level tasks. To a crucial degree the activities of the new institution will be made up of services connected with the preparation of applications, the creation and maintenance of ESZR/MSZR [Uniform Computer Technology System and Minicomputer System] systems and providing software.

Videoton will gradually build up a national network to provide customer services and associated device-oriented applications development services for its products.

In the execution of the program the program counts on "small" service organizations adapting to environmental expectations in the areas of consulting, software supply and maintenance and organization.

In the interest of rational use of capacity the program wants to aid the creation of associations with the participation of budgetary organs and enterprises, on the basis of the favorable experiences thus far.

The basic expectation in regard to organizations providing computer technology services is that there will be a breakthrough and that the creation of ad hoc systems will gradually be replaced by the creation of intellectual products which can be generally used and propagated. The program judges that the conditions for this are largely given in the system of professional institutions. In order for computer technology investments to represent a real alternative to other investments, to an increased degree, the program sets forth a conditions system harmonized with the economic possibilities.

Machines of domestic manufacture and socialist import ESZR/MSZR machines will make up by far the greatest part of the hardware investments. The commercial and trading enterprises will have the task, while paying attention to trade policy viewpoints, of acquiring devices which ensure modern operational modes, have a reliable and continual supply of parts and a supply of software. In the interest of increasing the reliability of these systems and in order to solve some economically significant tasks it will continue to be possible to count on non-ruble accounting import also, as a function of the current general economic situation and ability to deliver.

In order to realize the goals of organizations using computer technology and in order to make effective use of the devices the program regards improving the level of software supply to be a stressed task. It plans to solve this task in harmony with research and development and applications development.

In the interest of providing basic and systems software for imported ESZR computers the development of framework software systems has begun already. This store of programs will be expanded in the course of the plan period. Software purchases to satisfy national level, general needs will take place within the framework of and to the burden of the Computer Technology Applications Development Fund. It is expected that a remote data processing monitor will be acquired in the near future, with the aid of which the earlier acquired and already widely used IDMS data base management system can be operated in a remote data processing environment. We are in the process of acquiring a program package suitable for efficient, grouped data collection tasks on MSZR machines and a data base management system based on these machines which will aid more efficient utilization. We mention here only equipment which will be realized in the near future. In the area of improving software supply the possibilities of socialist international contacts have not yet been exploited sufficiently. The acquisition of good systems suitable for use nationwide could be prepared with a more flexible business and market policy.

Within the framework of program A/6, dealing with research and development on computer technology applications systems, of the National Medium Range Research and Development Plan (OKKFT) and in harmony with measures of the SZKFP we have planned, among other things, the creation of a services laboratory based on existing equipment which will aid a broad range of applications with economical, good quality program products and demonstrate in practice the possibilities of producing economical software in an industrial way. As a new type of service we will make hardware and software available to the development experts of users.

The increasingly significant non-ruble accounting export of software is a unique area for acquiring and passing on information. In addition to generating foreign exchange directly it makes possible the adoption of modern, developed technologies in that the participating institutions are filling orders which have higher quality requirements than the domestic ones.

Obtaining the financial resources for the computer technology hardware investments planned by the management organizations is not free of problems. It is an important condition for the realization of their developmental goals

that credit resources of suitable magnitude be available. The currently valid credit policy guiding principles are a condition for making use of credit. Taking into consideration the narrowness of resources available at the national economic level it will be necessary to conduct a selective credit practice. The primary viewpoint in judging credit competitions--as for other investments--should be the utility and efficiency of the system. In harmony with the economic policy goals of the Sixth Five Year Plan the program counts to a more significant degree than earlier on the management organizations making use of their own resources. In this connection also a computer technology investment is "only" an investment. So it should fit the chief goals of the organization and represent a realistic resource alternative for attaining them.

The program will pay close attention to the availibility of credit resources at all times and as necessary will devise measures to solve problems which arise. In the interest of this, however, it will be necessary for the management organizations to have definite medium-range computer technology ideas, in harmony with their medium-range plans.

The SZKFP occupies a special place among central developmental programs. It has a complex linkage system with other stressed government economic programs and it can effectively support their fulfillment. More than 50 percent of the management organs are affected in its execution. Guidance of the program is based on the coordinated activity of a number of chief authorities and it will adapt flexibly to changed economic conditions. It will be continually harmonized with goals defined in the national economic plan and with the pace of their execution. The several components of the conditions system will be coordinated, with special regard to software supply and raising the level of applications development services.

The measures of the concrete program of the SZKFP--formulated on the basis of observations from a broad circle of those interested--provide the necessary frameworks for further progress. But attaining the goals put forward will require the coordinated work of the organizations already using computer technology and those planning to exploit the possibilities thereof.

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BULGARIAN SPECIAL MICROPROCESSOR SYSTEMS

Budapest SZAMITASTECHNIKA in Hungarian Dec 81 p 4

[Article by "sk": "Bulgarian Special Microprocessor Systems"]

[Text] In the applications systems described in the article the specifics of the tasks dictated that goal-orientated microprocessor control units (microcomputers) be developed. Task-oriented peripheral equipment is connected to these also.

The IZOT 1001 C Entry and Exit Control System

The IZOT 1001 C system serves to check the presence and movement of employees in factories and institutions. The system makes possible the introduction of flexible work times, which is advantageous in production, and helps to solve transportation difficulties or problems (for example, if a worker must leave the job prior to the end of work time on personal business).

At the end of the accounting period (week or month) the system prepares a report on the time worked by every single worker and this report can be used for wage calculations.

There are various ways to check presence and movement during work time, which can be automatic or non-automatic. From this viewpoint the IZOT 1001 C system is among the most modern automated systems.

The chief functions of the system are the following:

--with the aid of terminals placed at entry and exit points it checks the entry and departure of personnel with the aid of personal magnetic identity cards;

--it prepares a printed certificate on every entry and exit;

--it records the information on a flexible magnetic disc;

--it stores data on every person separately;

--on command by the operator it displays or writes out the data pertaining to individuals;

--it checks the correctness of the personal magnetic identity cards; and

--the parameters of flexible work time can be set in accordance with the needs of the several user institutions.

The system can serve institutions with a maximum of 3,000 people. It stores the data pertaining to each member and at the end of the accounting period it displays these data on a printer, also recording them on flexible magnetic disc for further processing.

The entry and exit terminals are intelligent equipment controlled by a microprocessor. These are placed at entryways and exits. The terminals have a magnetic card reader, a special functional keyboard and digital display. When the personal magnetic identity cards are placed in the reader the flexible work time balance at the time of entry or exit appears on the display. It is possible to indicate with the functional keyboard whether an entry or exit is taking place, among other things.

In the configuration of the system there are, in addition to the central unit, a screen display with alphanumeric keyboard, an ESZ 7184 daisy wheel printer, a flexible magnetic disc unit, and IZOT 6500 C magnetic card accounting device and, in the present version, three IZOT 6600 C entry and exit terminals.

Typing and Text Processing System

The typing and text processing system serves to automate typing and greatly increases the efficiency of work connected with preparing, editing and duplicating texts. The core of the system is the IZOT 1002 C text processing system, which offers a number of advantages as compared to traditional methods.

The system, which automates typing and text processing, offers the following aid in connection with processing textual documents:

--initial typing of texts;

--editing and correcting of texts, in the course of which signs or letters can be inserted, transposed, shifted or erased and words or entire portions of text can be moved;

--printing out of texts, in the course of which one can prepare a working copy or a typewriter quality printout containing the final text of the document;

--duplication of documents;

--recording of finished documents or documents being worked on on a magnetic data carrier, cataloging and classifying them, thus providing for automatic retrieval of the stored information; and

--addressing letters according to the address list provided.

When developing the configuration of the system far-reaching attention was given to the requirements of modern work organization and technological processes of

typing offices. The separate operator consoles were developed taking into consideration ergonomic conditions which make possible work over long periods.

The central unit of the IZOT 1002 C text processing equipment constituting the core of the system is based on a microprocessor in the 600 family, with 48 K bytes of operational storage. This is connected to a Latin and Cyrilic alphanumeric and functional keyboard, an ESZ 7187 daisy wheel printer with a writing speed of 30 characters per second, a VKP 291-2 display (displaying 80 characters in 24 lines) and a flexible magnetic disc memory.

Documents are typed by a MARICA-11 and MARCIA-12 electric typewriter with 44 keys and a roller width of 235-245 mm.

An OT 2003 and an OT 2008 light copier provide copies of documents. The OT 2003 makes eight copies a minute in the A4 format (without reduction), with automatic paper feed. The speed of the OT 2008 is 50-150 copies per minute, with a document size of 250 X 351 mm. Paper feed is automatic or manual.

The system includes various types of office equipment--desks, files, storage for flexible magnetic discs, telephones, adjustable desk lamps and typists' chairs.

The IZOT 1003 C

The IZOT 1003 C microcomputer system was designed to automate information processing for department stores and commercial centers. With its aid one can provide better information for various leadership levels, automate administrative functions and improve the efficiency of the entire institution.

A special, high level language was developed to prepare user programs. The translating system of the language, which is made available to the user on disc, makes possible the quick and easy writing, translation, testing, correction and recording on flexible magnetic disc of programs. In addition the system provides for the copying of programs, records or texts from one disc to another, the copying of the entire contents of a disc, the preparation of discs for writing (zoning), the running of diagnostic tests and the transmission-reception of data on telecommunications lines.

The IZOT 1003 C system makes possible the automation of the following types of administrative operations:

--keeping track of the arrival and shipment of goods by quantity and value;

--recording price changes and carrying them over to a given period;

--keeping track of the fulfillment of contracts and orders;

--keeping track of fulfillment by period, type of product and product groups; and

--wage accounting.

The equipment consists of one operator console and two separate units. In addition to a microprocessor control unit belonging to the SZM 600 family the operator console contains:

--a keyboard (for the input of alphanumeric data, programs and texts), separate numerics for the input of numbers and a functional keyboard to give operating modes or query conditions;

--displays: a numeric one to display input numbers and intermediate results and a functional one to display the state of the system; and

--an ESZ 7187 printer with a speed of 30 characters per second, equipped with special electromechanical feed equipment.

The central unit uses 24 K bytes of operational storage and 18 K bytes of ROM. The operations which can be done with 14 digit numbers are: addition, subtraction, multiplication, division and calculation of percents and miles. The text register is 128 characters long.

One of the separate units contains two flexible magnetic discs and the other contains one flexible magnetic disc and a modem. The system can store 30,000 records on one disc.

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MERA 9150 GROUPED DATA RECORDING EQUIPMENT

Budapest SZAMITASTECHNIKA in Hungarian Dec 81 p 4

[Article by S.Z.: "The MERA 9150; A Modern Device for Data Preparation"]

[Text] For a long time data recording has been the bottleneck for data processing. The development of devices and of computer technology has brought the times needed for the two mechanical functions--data input and the display of results--close to the processing times. The display of data is solved with the development of buffering technology; data recording is solved with the development of grouped data recording and data preparation equipment.

Grouped Data Recording

We could first meet with grouped data recording equipment 10-15 years ago. Since then development has been in three directions.

1. The appearance of complex data preparation functions with data recording--checking, editing, actualizing, ordering, conversion and data protection.

2. The appearance of special peripherals (in addition to punch card and punch tape readers)--picture tube terminals, optical character readers, industrial data collection stations, sound sensing terminals, matrix printers and line printers.

3. The effect of the development of remote data processing--distant data recording stations and systems thereof, remote programmable intelligent terminals, and grouped data recorders connected directly to a large central computer system.

With the spread of these trends the applications sphere of grouped data recorders broadened and they are indispensable in modern, efficient data processing.

One can find in our homeland quite a number of types of grouped data recorders. In recent years there has been a socialist supply also. In addition to the Hungarian made VIDEOPLEX types the Polish MERAMAT firm is manufacturing, on the basis of a Redifon license, the MERA 9150 grouped data recording equipment.

The first arrived in our homeland last year; at present 10-15 are in operation. In the future also the Polish side will be able to satisfy the demand.

The MERA 9150 And Its Possibilities

The equipment provides for input of data from the keyboards of stations with picture screens and the collection of them on magnetic disc (key-to-disc system); in addition it provides for the recording on magnetic tape from magnetic disc of checked and ordered data, which can be an efficient input for processing on a large computer. General operation of the system is ensured by the 7.E operating system provided by the manufacturer. The tasks which can be performed can be grouped around data recording and complex data preparation activities.

Data recording on the MERA 9150 system takes place on a picture screen unit with a modern alphanumeric keyboard. Textual error messages and technical information aid the work of the data recorder. Dynamic erasing and insertion of characters, fields and records is provided. Within one batch the operator can check any preceding or following record. One can query key field or character line. A flashing cursor indicates the character line found on the screen. Simultaneous multicopy printing can be performed with the data input operations.

The following activities are possible with complex data preparation:

--checking: the data can be checked syntactically (depending on recording) and semantically (reflecting content relationships). To increase the precision of data input one can generate and evaluate check digits. Checking can be at record level or batch level. In addition to indicating faulty fields and records one can prepare a list of faulty files.

--ordering: with the aid of prepared ordering programs the records of any batch can be put in order according to a key developed from one or more fields.

--conversion: the system works with an EBCDIC code set but with the aid of system programs one can set up ASCII, BCD, Honeywell, ICL and other special code sets.

--actualization: data already recorded and stored on magnetic disc can be modified.

--data protection: activities of the control operator (supervisor mode) are protected with a password in the interest of avoiding unauthorized access.

In the MERA 9150 system there is no need for a favored work station to perform supervisory functions. Any station can be made into the control station by means of the supervisory key. From a work station one can perform recording, checking and correction; other activities are in the supervisor mode.

The system can be programmed in the VALIDATOR high level problem-oriented language. The language is of the COBOL type and can be learned easily.

One can prepare the following programs in the VALIDATOR language: a record checking program, a batch checking program, an ordering program and an output editing program.

The MERA 9150 hardware can be built modularly. The central unit has a universally programmed processor and ferrite operating memory with a capacity of 32 K words (one word equals 16 bits).

The cycle time is 1,200 ns. The magnetic disc storage (MERA 9425) is manufactured on the basis of a CDC license and has a capacity of 5 M bytes. (Of this 2.5 M bytes is fixed and 2.5 M bytes is exchangeable). A maximum of two units can be connected to the magnetic disc control unit. The magnetic tape storage (PT-305) has nine channels with a writing density of 800 bpi. The equipment meets ISO standards. A maximum of four units can be connected to the magnetic tape control unit. The average printing speed of the DZM-180 matrix printer is 45-55 lines per minute; it has a character set of 64 and the maximum number of copies is five. The data input station consists of a screen and a keyboard. Two types of keyboard are possible: a punch card type and a typewriter type (and control keys). The maximum number of data input stations in one system is 32 (the recommended maximum is 24). With a line amplifier the maximum distance of data input stations from the central unit is 610 meters, without it the maximum is 350 meters.

The MERA 9150 can also be operated in a remote processing network, with an IBM 2780 terminal algorithm.

Equipment being developed is: a card punch, a line printer, an optical character reader, a remote terminal, an interactive remote terminal and an intelligent terminal.

Direct connection of the system to a large central computer is being developed. The space requirement for the central unit of the MERA 9150 configuration is 15 square meters. Its price with eight work stations is 5 million forints and about 6 million forints with 16 work stations.

Technological Advantages

--Easy to operate, picture screen input, a flashing cursor and information aiding the work of the operator (a help subsystem);

--Divided data input, a 32 terminal maximum, as much as 610 meters from the central unit;

--Automatability (a program library and system programs for typical tasks);

--Reviewable, multicopy, edited output;

--Reliability and data protection; checking routines, algorithms, password protection;

--Operation; it is possible to increase efficiency via evaluation of operator's statistics and selecting the optimal ratios of operational modes.

On the basis of the favorable technological properties and the acceptable price/performance relationship we expect the spread of the MERA grouped data preparation equipment, which is available from the socialist relationship along with the Hungarian VIDEOPLEX equipment. The OSZV [National Computer Technology Enterprise] will market the MERA system and provide complex technical services.

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INTERVIEW WITH V. A. MYASNYKOV

Budapest SZAMITASTECHNIKA in Hungarian Dec 81 p 9

[Interview with V. A. Myasnykov, computer technology chief of the Scientific and Technical State Committee of the Soviet Union, by K. S.: "New Architectures; Software Will Be a Commodity"]

[Text] On the occasion of the second international conference on "Use of Microprocessors and Microcomputers," held in our homeland at the beginning of October, V. A. Myasnykov, chief of the Computer Technology and Automated Control Main Directorate of the Scientific and Technical State Committee of the Soviet Union, visited Hungary and gave a talk at the conference. He visited a number of technical institutes. The chief director gave the following interview to our journal.

[Question] At the present time, obviously, the greatest attention is being turned to applications of computer technology in the Soviet Union, just as in our homeland. Could you outline the most important trends in this area.

[Answer] In the Soviet Union great attention is being turned to perfecting economic guidance, to increasing the efficiency of social production. A primary role is being given to applications of computer technology and automated and automatic guidance systems. At present we attribute the greatest importance to the following computer technology applications systems.

The first group of systems is automated and automatic guidance systems for complex technological processes, equipment and special systems. Here we regard automatic systems as the limiting case of automated systems, where a human either does not participate in or merely watches the control process. There are now nearly 3,000 such systems in the Soviet Union. The second group of systems is automated economic and organizational guidance systems (branch automated guidance systems and automated guidance systems of associations and enterprises). Virtually all republic and all-union ministries carry out their tasks with the aid of branch computerized guidance systems. At present these number 270; there are 2,500 enterprise guidance systems. Automated technical planning systems (AMT) belong to the third group of systems. The fourth group consists of automated systems for scientific research and experiments. As a fifth group I would mention information retrieval systems.

[Question] According to our information the role of the Scientific and Technical State Committee of the Soviet Union (hereinafter, GKNT) in the development of Soviet computer technology resembles that of the SZKCP [Central Program for Computer Technology] committee here. Could you tell us about the activity of the Computer Technology and Automated Control Main Directorate.

[Answer] Work in the lines listed above takes place on the basis of complex programs which are organized by the GKNT. The organizer of the complex programs within the GKNT is the Main Directorate for Computer Technology and Control Systems.

It is obvious that the creation of new systems and the further development of existing ones is impossible without the appropriate technical and programming tools. Therefore the main directorate, together with the appropriate ministries, has developed a few programs which are directed directly at the development of computer technology tools. Hungarian experts are well acquainted with the Soviet computers of the ESZR [Uniform Computer Technology System] and MSZR [Minicomputer System] types manufactured in series and with those the development of which will be completed in the 1981-1985 period. So I would like only to emphasize that the essence of our developmental strategy is to accelerate the creation of universal, very high performance computers (5 million operations per second and above) and to greatly increase the number of mini-and microcomputers available. This is dictated primarily by the requirement of planning and putting into operation more actively than heretofore collective use computer centers where the mini-and microcomputers function as intelligent terminals. Thus the specific quantity of medium capacity computers will decrease in comparison to the total computer park. I should also note that the collective use computer centers must provide users not only machine time but also programming services. In order that industry should develop and manufacture those technical and programming tools which are most important for the economy of the Soviet Union we have introduced a system according to which the technical plans for the development of computers, general purpose peripheral equipment, mini-and microcomputers and software for all these must be harmonized with the Main Directorate for Computer Technology and Automated Systems. In addition, the enterprises manufacturing computer technology devices must harmonize manufacturing specifications with us when starting manufacture. Thus not only can we maintain control of the technical level of computer technology equipment but also we can integrate those needs, the "orders," which all branches of the economy make in regard to the technical and programming tools needed in the country. This shows the great advantage of a socialist planned economy.

[Question] In what directions is computer technology development going most intensively?

[Answer] It is our opinion that developmental work in the area of computer technology must be made more intensive in our homeland, we must work out possibilities for the realization of new architectural solutions which, even in their basic principles, go beyond the traditionally developed computers.

In the Soviet Union, for example, successful developmental work is being done in an institute belonging to the Ministry of the Instruments Industry, Automatic Devices and Control Systems, dealing with control problems, directed at the creation of a computer with a restructurable architecture. Series manufacture has begun already; in the area of the Higher and Middle Education Ministry of the Russian Federal Republic the development of so-called recursive computers is prodeeding very successfully. We are turning the greatest attention now to microelectronics, the development of which is having a revolutionary effect on the development of computer technology and on its penetration of every area of life. In the Soviet Union they are now working on a complex program directed at broad application of microprocessor computer technology; they will devise microprocessor type tools for the control of various types of equipment, instruments and measuring devices. The training and tetraining of experts in higher and middle study institutions will play a very great role in this important question.

[Question] You have now visited Hungary for the first time. Give us a few words about you impressions and experiences.

[Answer] Getting to know the Hungarian institutes playing a leading role in the area of computer technology development, among then the Videoton Electrotechnical Factory, and my conversations with the leadership of the OMFB [National Technical Development Committee] and my colleagues working in the Computer Technology and Automation Secretariat have convinced me that in Hungary also great significane is attributed to the use of microprocessor devices. It is worthy of note than an international conference dealing with the use of microprocessor devices has been held in Hungary for a second time. The Soviet delegation, and myself personally, was very pleased by the well organized conduct of this international forum and by the information provided by the very substantive presentations.

As for my impressions gained on the basis of my visits to the institutes and my conversations about computer technology with Hungarian experts, I might formulate these as follows. Very good quality characterizes the development and production of computer technology devices in Hungary; I find the development of software especially intensive. Extraordinarily great demand is appearing in the Soviet Union for systems operating on the basis of the ESZ 1010 machines and for the peripheral equipment, especially the terminals.

[Question] You stressed the intensity of Hungarian software development. Unfortunately we cannot yet boast of any great success in software trade among socialist countries.

[Answer] That is true; but as long as we are talking about software, I would like to speak about it a little more broadly. We have come to the important recognition that software products must be treated in exactly the same way as other products of basic production, a decision which has economic, legal and other consequences. Now the situation, even for us, is that the value of program tools. Simply recognizing this fact makes it possible to develop prices for software products correctly and we should improve trade in software with a buying and selling machanism.

Permit me one more observation. Academician Glushkov has said that the principle of highest level leadership is extraordinarily important for any automated guidance system. If the leader--at whatever level of leadership--does not maintain control over the perfection of the guidance system, and thus the economic system, aided by computer technology then such as system will be of very little use. So the further training of those working in leading positions is very important in the area of the applications possibilities of computer technology and economic-mathematical methods. We have done very much for this in the Soviet Union already. The Economic Guidance Academy has been working with the Council of Ministers of the Soviet Union for several years--institutes providing further training for leaders work successfully in every branch.

The chairman of the GKNT, Academician Marchuk, a famous mathematician, initiated and personally led a series of study courses on computers and their applications for leading workers of the GKNT. This was a natural step, for the committee is the leader of scientific and technical progress--and computers and the systems based on them are influencing every area of our activity.

Finally, I would like to express my appreciation to all my Hungarian colleagues, who devoted great attention to the stay here of the Soviet delegation.

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DATA-BASE HANDLING SYSTEMS IN VIDEOTON COMPUTERS

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UNGAR, JANOS, program designer, Videoton Development Institute

[Abstract] The DMS60 and DMS600 systems, designed for the ESER 1010 and ESER 1010M computers, respectively, are described. The DMS600 is an upgraded version of the DMS 60, the former containing additional quantitative features and auxiliary programs. The upgrading is part of the development concept following the sequence from ESER 1010 through the ESER 1010M to the ESER 1011 (progress from multitask operation to multiprogramming operation) and the sequence from the MTM monitor to the MTM2 monitor, as well as parallel upgrading of the corresponding software. Both systems are autonomous and can fully handle a broad range of tasks. They are CODASYL type multiuser systems, using network type data models. They maintain the data base up to date all time. They are on-line transaction systems in which the users are local display terminals. They also allow ad hoc interrogation at a high-level interrogating language. The systems have separate data-describing, transaction, and macro languages. The transaction language is used primarily to handle the terminals. The macro language is the means for base modification and ad hoc interrogation. Data protection and security provisions are available. The features of the data-base handling subsystem are the data structure, the memory structure, the structure of the internal data sets, the structure of the data-base record, and the programs of the data-base handling subsystem. The basic data-set handling operations are the interrogation of the data base, access to the record, reading the record into the memory, and modification of the data base. The person using the terminal uses the screen and the keyboard as if he were to fill out a form. The programs of the data-acquisition system are disk-handling and terminal-handling routines. There are also interface programs (to provide access to the data-base handling subsystem) and auxiliary programs (booting the data base, cold-hot restart, reorganization of the data base, data directory and data-path operations, updating of the data base, and handling the internal spool. Figures 7, table 1, references 5: all Hungarian.

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DEVELOPMENTS IN COMPUTER INDUSTRY DESCRIBED

Minicomputer Industry, Information Science

Warsaw INFORMATYKA in Polish No 11-12, Nov-Dec 82 pp 6-9

[Article by Doc Dr Eng Henryk Orlowski:* "The Minicomputer Industry and Information Science in Poland"]

[Text] Complying with a request by INFORMATYKA's readers on the present status of the computer industry and information science in Poland as well as the desired trends of development.

I would like to emphasize the difference between the computer industry and information science. The computer industry supplies the resources and working tools for information science, hardware as well as software. On the other hand, information science is that science and branch of industry that is concerned with computer applications and often with a change in environment in order to use computer techniques effectively (for example, a change in the method of management or organizational structures).

An analogous difference occurs, for example, between the industry concerned with producing automobiles and the engineering of road traffic. No matter in how many ways these two activities mesh with and affect one another, they use different methods in research and development work and in their economic practices require employees having different qualifications and, what is more important, the goals for their optimal operation can be different. I believe that many misunderstandings and even strains arising within groups in their formulations and activities can be avoided if the difference between the computer industry and information science is understood.

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The Present State of the Minicomputer Industry

In the mid-1970's, two negative factors appeared relative to the development and operation of the computer industry in Poland. First, the central authorities, deeply disillusioned with the results of implementing a number of large information science systems (information science was not the key to prosperity) and the known costs incurred for these systems (including foreign exchange), went to a second extreme. They recognized that the computerization of the national economy should no longer be supported (financially and otherwise). Secondly, they realized that the dynamic expansion of the investment program must be slowed down and that resources must be allocated for market production (to bring into balance payments made during the course of investing) and pro-export production (to repay debts). The economic strategy by no means encompasses all areas of investment, but it did affect information science and the computer industry. Computer equipment was considered to be capital goods production and domestic deliveries were severely curtailed.

In accordance with the ideology of this "strategy," only two actions were supported by the MPP [Ministry of Machine Engineering Industry]: market production and export. So-called co-production was tolerated but investment production was eliminated. In this situation the computer industry had the alternative of gearing up for export or cease to exist. The industry chose the former.

Among the three possible directions for export (utility systems, computer configurations and the bulk sales of peripheral equipment and memories), the minicomputer industry successfully realized the third. Production was systematically increased such that in 1980 about 19,000 units of memory and peripheral equipment were produced in Poland, of which 13,000 were exported. Exports to the dollar zone expanded so much that in 1980 more foreign exchange was earned than was paid out for the purchase of components and material from the II payments area [capitalist countries] for MERA's [Automation and Measuring Apparatus Industry Association] entire production. Exports to the I payments area are large and very profitable.

The success achieved here was due to license (especially for masaic printers and floppy disks), to our own developments (cassette tape memories, ferrite internal memories, reader stations and paper tape punches) and to post licensing developments (especially cathode ray tube monitors). The MERA-BLONIE plants became not only the largest printer factory in the CEMA but also in Europe.

In summary, in as much as the actions of the minicomputer industry in the production of peripheral devices and memories were very successful. Their achievements in the production of utility systems and minicomputer systems are significantly less so, less than our ambitions and potential capabilities. It is not, however, as some believe, an insignificant production. In 1980 about 800 microcomputer and minicomputer configurations were produced (from the largest to the smallest they are the MERA 400, SM 3, MERA 60, MERA 200, MERA 2500, MERA 100 and MERA 9150). Of this production, domestic customers

received only about 300 configurations, including about 170 of the well-known MERA 400's. The small number of domestic deliveries is certainly the reason why in fact the computer industry's production is not known.

Then what was the reason for the significant underproduction of microcomputers and minicomputers for export? The basic reason is the underdevelopment of our electronics industry. Considering the fantastic increase in the scale of integrating electronic components over the past several years, a computer industry that does not have access to modern components is destined to be underdeveloped (I would not like to prophesize that it would be eliminated).

To achieve the mentioned level of 800 configurations annually, various methods were contrived:

--To realize exports to the II payments area, the most modern components were purchased to assemble the minicomputers (MERA 2500, MERA 200 and in previous years the MERA 100). Because of their large foreign exchange costs, these minicomputers were not available on the domestic market.

--To realize exports to the I payments area [socialist countries] and to maintain sensible price ratios as well as to assure compatability with the SM [minicomputer system] family, processors were purchased from the Soviet Union on which the assembled systems were based, which were then exported along with the software (SM 3, MERA 60).

--Systems were produced for those domestic customers who could provide their own foreign exchange for the purchase of components (MERA 9150).

--The other export items (beside the unique ones) were utility systems that were sold in such large hardware and software configurations that the cost of the central processing unit ceased to be of importance vis-a-vis the entire configuration (for example, the MERA 400 to control a refinery in the USSR and the ODRA 1325 for the CRPD [Central Recording and Processing of Data] in Hungary). There also were sepcific orders, for example, from Italy for the purchase of a larger number of MERA 400 units, but the price the Italians were inclined to pay (and not surprisingly) for these configurations was less than half our production costs. This is but one more confirmation of the thesis that without access to components having a high degree of integration (including semiconductor memories) and at prices and of a quality to be competitive worldwide, it is impossible to produce profitable central processing units for microcomputers and minicomputers.

Another reason our exports of minicomputer configurations to the CEMA countries were limited was the fact that all of these countries initiated their own production of minicomputers and, in effect, for understandable reasons, did not want to purchase from us. If the mentioned reasons can be acknowledged to be objective (at least from the viewpoint of the computer industry) then a number of subjective reasons also appeared.

The computer industry assumed the burden of developing and producing the MERA 400 as a result of the termination of the infamous K-202 affair.

As a result:

--The finances and potential of the producers were split between two software lines (SM--to permit export and MERA 400--in order not to sell a completely naked replacement for the K-202).

--The software, training and technical literature associated with the purchase by Poland in the 1970's of several dozen PDP-11 configurations were not used in the development of the main minicomputer produced in Poland (that is, the MERA 400).

--The accomplishments of the domestic users of the minicomputer systems based on the MERA 400 were not profitable in export. CEMA purchasers were inclined to buy the SM line of minicomputer systems.

I believe this last result is especially unfavorable. It is a fact that the export of utility systems is much more profitable than the export of configurations, especially peripheral devices. Meanwhile minicomputer systems in Poland have been and are being developed mainly on the bais of the MERA 400. If, however, they were developed on the basis of SM hardware then we would have a wider range of offers to export to the I payments area (presently only CAMAC systems), and we also could export systems to the II payments area, replacing the original PDP-11 in the exported systems with SM central processing units and at the same time solving the problems of cost (which I mentioned above), unreliability, replacement parts and service of distant markets.

Another reason why our exports are limited has to do with the MERA 400 and MERA 200. In preparing the export of these minicomputers to the capitalist countries, MERA-BLONA, which did very well in the production of printers, did not take care ahead of time to offer extensive software at the same time it marketed the hardware. This mistake decreased the effectiveness of the offerings. Considering the features of the above minicomputers' basic software, a package of utility programs and systems for the end-to-end generation of programs were lacking.

In addition to the above mentioned reasons, a number of other factors, which have been characteristic for the entire economy during the entire course of its operation, are limiting the effective operation of the computer industry.

--The industry's entire production was based on the production of finished products, and the production of spare parts was severely limited. From another branch it is known that in 1981 over 40,000 tractors were not available for field work because of spare parts shortages. I do not know the numbers relative to minicomputer configurations and peripheral devices, but the tie-ups caused by a lack of spare parts are very large.

--Relics of 19th century economic doctrines that are burdening our economic life require that the software, design and service work done by the industry be treated as a surcharge on direct labor which places continuous limitations on them. A number of indexes obligating the industry (for example, the ratio of employees that are directly producing to those indirectly

producing plus research personnel) forced the industry, in the specific case of minicomputer configurations, to act against the best interests of the users, and thus the national economy as a whole.

--The imperfections of the trade mechanisms within the CEMA framework (which, in view of INFORMATYKA' thematic profile, I will not expand upon here) so far have made it impossible to benefit from all the potential advantages inherent in the uniform system of minicomputers in the CEMA countries (for example, independently configuring systems using equipment produced in different countries, software sales and the like).

--The necessity to carry out plans at all costs which gives rise to the production of systems configured according to production capabilities and not to user needs (this is the reason in general for the scanty operating memories) and to lowering quality below the design level and mastered manufacturing technologies. In association with this, the lower quality of products is caused primarily by:

--The shortage of production material (especially electronic components) which places limits on their aging and selection.

--The purchase of components abroad not on a continuous basis from the same suppliers but in a haphazard way depending on which countries the banks had foreign exchange surpluses or open lines of credit.

--Missing components often are received at the last moment and as a result systems are completed in haste, and in particular the aging and testing programs are not maintained. This is why some minicomupter configurations operate very well at the users' sites and others very poorly.

With what I have written above, I do not mean to imply that I am satisfied with the present status of Poland's minicomputer industry, and I suspect other reasons for eventual future imperfections lie in external factors. In any case, one can operate better or worse, and produce better or worse products. However, I believe that the present state of our minicomputer industry is much better than many computer scientists believe.

Prospects for the Minicomputer Industry

To maintain and expand the potential of the minicomputer industry, I believe that its pro-export character should be preserved. In this area, we should expand our production of peripheral equipment and auxiliary memories to be designated primarily for export to the CEMA countries. Considering investment limitations, I do not believe it is possible to expand equipment assortment, but we should improve the paramenters of presently produced equipment, increasing their production (including design and technological changes), eliminate the import of materials and components, and resolve problems as a composite unity (for example, we should initiate the production in Poland of disc files and disc cassettes in as much as we produce memories that use these devices). In due time we should also prepare new equipment in assortments produced to date.

To expand the production of peripheral devices and memories, especially minicomputer configurations, it is essential that Poland master the production of commercial electronic components of high and very high scales of integration. I beleive that in this area the close cooperation of the facilities of the electronic and computer industries is possible and downright necessary. In as much as the electronics industry already has the technology which would permit the manufacture of such components, then to a very limited degree it has the capability of designing and testing such components. The start-up time to initiate the production of new components is very long, and for economic reasons it will be impossible to produce small series of components, that is in such quantities that are needed by the computer industry.

The designing and testing of modern components can be done only by computer methods, thus it is only natural that the scientific research facilities of the computer industry would be instrumental in resolving these problems. Thus I believe that it is most important that these facilities participate in the preparations for the manufacture of modern electronic components, in addition to the development of peripheral devices and memories. Only when we have the capability of designing and obtaining components to satisfy our own needs will we really be able to develop and produce new central processing units and minicomputer configurations which would replace the generation of mini and microcomputers now produced in Poland.

From the viewpoint of the current needs of information science, in addition to equipping it with data carriers and other operating material, I believe that the industry would do the most good by upgrading existing configurations. This upgrading, among other things, should be based on:

--Rehauling all equipment having poor MTBF's (mean time between failures).

--Assuring proper servicing of replaceable packets or entire subassemblies, subsequently repairing them at the manufacturer's facility under industrial conditions. I see no reason why effective repairs could not be made the day after the order is received (only, of course, after changing the present system of economic regualtions).

--Existing configurations should be supplemented with greater operating memories, additional monitors and auxiliary memories, and in the case of powerful minicomputers (such as the MERA 400) operations in the multiprogram and multiaccess modes should become universal. If we take this path, we should achieve significantly better useful results with the limited amount of material and foreign exchange that we have than by producing new configurations. A separate problem is the necessity to implement such economic mechanisms so that the postulated actions would benefit the self-governing work forces of the computer industry.

--In as much as the PDP-11 configurations installed in Poland in most cases also appear in framework configurations that are barely sufficient for user needs, I suggest that the modest foreign exchange funds that will be at users' disposal over the next few years not be used to purchase prepared blocks

abroad but be used to produce additional equipment in Poland in order to use them with the PDP-11 systems already purchased. This can be realized by taking advantage of the work being done on SM minicomputers at the IMM [Institute for Mathematical Machines] Experimental Laboratory.

--Software quality should be improved and the scope of programs generated centrally should be expanded (especially for the MERA 400).

--Relative to the production and development of minicomputers, I believe that now we should place primary emphasis on configurations that are compatible with the PDP-11.

The following possibilities exist here:

--The MERA 60 (SM 50/50-3) is the counterpart of the LSI-11/2 produced by MERA-STER in Katowice using Soviet central processing units.

--The SM 4 is a relatively close counterpart of the PDP-11/40. It can be pruchased in complete configurations from the Soviet Union. It also can be complemented by MERA-CENTRUM in Warsaw using Soviet processors.

--The SM 50/50-1 is the counterpart of the PDP-11-34. A prototype was developed at the IMM in Warsaw with the participation of MERA-PIAP. The following applications of this minicomputer are now envisioned: in bank terminal networks produced by ELWRO, in the new data collection system having expanded capability for local processing (replacement for the MERA 9150) and for applications that must be especially reliable (real-time control) for which the SM 4's reliability parameters would be inadequate. The IMM Experimental Center will produce the configurations for these latter applications.

All three of the above named minicomputers are software compatible and in addition they can use the utility programs developed for the PDP-11 minicomputer which provides many advantages to the users.

In my opinion the viewpoint that one should forsake one's own work on software and limit oneself only to adapting existing software when producing computer hardware that is compatible with products from a known firm is profoundly wrong. Such a viewpoint caused us much harm in applying the RYAD family of computers. In as much as the technical parameters of our hardware, the configurations on hand and economic relations differ in Poland for the original models, it is obvious that, for example, optimal operating systems for original configurations are not at all necessarily the best for our configurations.

Secondly, whoever elects to adopt someone else's solutions will beforehand be condemned to have products that are late in development and that will not be up to date. That is why I believe that industrial programming centers as well as groups working outside industry should work unreservedly on the original SM software which will have the additional advantage that successful products can achieve additional markets in the CEMA countries on SM machines as well as in other countries on PDP-11 machines or those having the same instruction set.

Relative to the MERA 400 computer, one must draw a pragmatic conclusion from the fact that this is a minicomputer having immense calculating power, whose production has been mastered and of which over 400 units have already been sold. I also believe that the previous comment concerning the upgrading of existing configurations should apply especially to this minicomputer. But I would not recommend basing it on the new, interesting utility systems because such systems should be based on SM minicomputers which will guarantee export possibilities.

A separate problem is the question of a future minicomputer which would replace the minicomputers now being produced in Poland. Relative to the features of this minicomputer, it is essential that the following basic assumptions be accepted:

--It should have significantly greater computing power than the models now being produced because in a couple of years microcomputers or programmed calculators will replace the present minicomputers.

--It should be a member of the SM family which guarantees the possibility of its export (even in configurations) within the framework of the CEMA countries.

--It should accept the utility software of existing SM computers as well as of the MERA 400 in order not to leave the users "on ice."

--It must not be a copy or an analog of subsequent DEC series model because, as a result of new designs in electronic technology, the development and production of such copies under our conditions would be economically unprofitable to say nothing of their contradictions.

The most apt proposition in this area is the minicomputer whose concept was presented at the IMM seminar in Warsaw on 24 April 1981 (see INFORMATYKA No 7-8/81). It is obvious that the prospects for its production will depend in a fundamental way on solving the component base problem. Problems to date that have hampered user operations or made them impossible must also be resolved, such as poor quality of hardware, lack of operating material and equipment, service and putting software distribution in order.

Present Status and Development Trends of Information Science

My views as an observer from industry in this area can be highly subjective. Once again I limit my comments to micro and minicomputers.

The quantitative level of micro and minicomputer applications is certainly much lower than the economic and civilization levels achieved by our country and less than the ambitions and capabilities of our computer scientists. I have observed that the application of WANG minicomputers for processing data and calculating, and the PDP-11 computer for control are successful and somewhat of a standard in our country.

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In general, however, minicomputers are not playing the role they should in Poland because of their very small numbers considering the size of the country, of the troubles that users encounter in their operation, mainly with respect to the shortage of data carriers (discettes, disc cassettes and lately paper), and of the incompleteness of configurations as well as the incompetence of service. There is an obvious lack of micro and minicomputer hardware at designers' workplaces (lack of personal computers) and at office workplaces, warehouses, medical clinics, cashiers' desks and the like. The relatively small number of minicomputers that are applied is a result of their high costs and, at the same time, low quality. To a great extent both of these factors are the result of using an obsolete component base.

Once again I emphasize that the development of production in Poland of modern large-scale-integration components is a key problem, and not only because of the needs of information science. It is a strategic problem for the future of Poland. I share the view of those specialists who believe that a country incapable of designing and producing its own integrated circuits within a dozen years or so will decline (if they have not done so already) to the level of a neocolonial country.

If we assume that the component base problem will be solved, then in the area of minicomputers information science's tasks will be:

--To equip the higher schools and a number of secondary schools with minicomputers having modern architectures and software. It is a pedagogical and economic absurdity to train future users and decision makers on obsolete hardware (often scrapped by economic-type ministries) and to expect economic planners to judiciously purchase and effectively use modern hardware. From the very foundations, in the training concepts to date for computer scientists which is not used in any modern country, one can perceive one of the important reasons for the failures of a number of costly computerized information applications purchased in the 1970's from the dollar zones. Let us recall, in view of our capabilities, how sensible it was to have the generation that was trained on the GIERZ and ELLIOTT computers, the world's most modern computers in their class at the time they were purchased for our universities, to design and program the ODRA 1204.

--Design offices, production preparation departments in factories, warehouses and so forth should be equipped with personal computers based on 16-bit micro and minicomputers and the PDP-11 instruction set.

To be sure, most applications will be realized on the Soviet ELEKTRONIKA-60 processor (that is the MERA 60 computer and its derivitives), but very complex applications will be realized on the Polish SM 50/50-1 minicomputer. Of course, the proper compliment of external equipment and auxiliary memories is essential from the viewpoint of the needs of individual users, as well as the development of parametricized utility program packets. The ideal would be that a user would obtain a configuration programmed for his application on which he could execute his tasks without the need to organize a computing center and employing official programmers. To this end, it is necessary to extensively overhaul or reorganize customer service departments and utility programs at the minicomputer buyer's location. We must also consider new, more efficient forms for generating utility programs and designing systems. I believe that the most efficient way to resolve the problem is to organize cooperatives consisting of several or a dozen or so individuals which would bring together system designers and programmers to fill orders at their own work places or at the customer's site. Such projects would not require investments and the cost surcharge on current operations would be minimal. Users would pay the programmers only when they are really needed and not--as currently practiced--from the moment the computer is purchased to the end of its operation.

Once more I emphasize that it is essential that minicomputers reach the user's workplace and not become the embryo for organizing separate computing centers.

--Banks, savings institutions, ticket sales and reservation offices and cash desks in large commercial establishments should be equipped with terminals or computerized cash desks, linked via concentrators--depending on need--to minicomputers or large computers. The SM 50/50-1 can function as the concentrator and minicomputer, and the R-32 computer or its replacement can be the large computer for the desk. Terminals are presently in production at ELWRO.

--Considering the low quality of the processors which we can purchase in the CEMA countries, developing highly reliable real-time systems is especially difficult. Of course, very simple systems based on the INTEL-8080 counterpart can be built and are being built at many Polish centers. Then again, for more complex systems I visualize two sensible paths, namely:

--For systems meant to serve objectives characterized by a large turnover of material or energy use, one can individually produce a higher quality SM 50/50-1 minicomputer by using special aging and component selection techniques as well as by testing subassemblies. Of course such applications cannot be too numerous because of the large costs associated with the construction of such a minicomputer and the difficulties in purchasing materials. This path may be taken to also solve the problems of supplementing and exchanging the many systems purchased in the 1970's in the capitalist countries for various sectors of our economy.

--For the remaining applications (for example, intensive therapy departments in hospitals and control in agriculture) we must await modern components of large and very large scales of integration and good reliability. Without these components we cannot produce cheap and reliable minicomputers in amounts needed for the described applications.

The readers may consider some of the above viewpoints as not too revealing, but I believe they have a right to know the author's viewpoints.

Problems of Unutilized Computers

Szczecin KURIER SZCZECINSKI in Polish 6 Apr 82 p 5

[Article: "About Information Science; Otherwise, Who Wants to Buy a Computer?"]

[Text] As a result of the investigation conducted by the NIK [Supreme Chamber of Control] during the second and third quarters of 1981 at the plant computer centers of the Ministries of Mining, Machine Engineering Industry, Heavy and Agricultural Machine Industry, and Agriculture, it was ascertained that in many cases computer hardware is underutilized.

Very often inappropriate or outright unnecessary purchases are made. Meanwhile, computers and peripheral devices take up space in warehouses waiting for appropriate sites to be prepared or the finalization of installation work which goes on for years.

Ignoring the reasons why the inappropriate purchasing decisions were made, the question arises: What should be done with the hardware? There is no lack of people eager for computers. Second-hand trading is now practically the only way possible; computer hardware is a scarce commodity in Poland.

If it is assumed that owners are storing their computers in warehouses or that those who do not need computerized information centers will want to get rid of the burdensome equipment, then a computer market can be organized.

However, in the opinion of Dr Janusz Gwiazda, director of the Secretariat of the Committee for Information Science, there are not too many people eager to get rid of their hardware. Nonetheless, the secretariat will share information with interested parties on how to sell a given equipment or from whom it can be purchased if need be.

The computer technical-commercial enterprise, which has been in operation over one month and which is based on the central office of the former information science association, a paid intermediary in computer hardware transactions, provides professional advice and estimates equipment value.

Computers are not easy to trade. Each user requires a given computer configuration along with its applied equipment. Thus the reselling of this apparatus is limited. For example, Wroclaw Polytechnic would like to get rid of a RYAD-32 computer which has non-standard, no-longer-in-production packets and a small-capacity memory.

As stated in the NIK report, thoughtless purchases of computer equipment caused much damage to the economy. For example, computer equipment to control a rolling process and worth over $11 million was purchased in the U.S.. After the equipment was obtained, the hot-rolled sheet rooling mill was not built and the computer equipment not used. This computer system is designed to meet the requirments of a specific process in a specific industrial enterprise. Thus, who will buy it?

Up to the time of the inspection, Austrian computers purchased in 1978 and worth 27 million zlotys were not being used.

The NIK report states further that as of the end of May 1981 the Warsaw MERA-Prefal enterprise for Industrial Automation had 19 Polish-made MERA-300 minicomputers worth 45 million zlotys purchased during the 1974-1979 period that are not being used. Will MERA-Prefal find a buyer for these already obsolete computers and, what is more, be unhappy with the high reputation of the users?

The NIK investigated only a few ministries. No doubt incidents of nonutilization of equipment occur in other ministries.

This needlessly purchased hardware described in the report does not probably represent a problem that is too troublesome, states Director Gwiazda. In another case its owners turned to the Secretariat of the Committee for Information Science for help to get rid of their equipment.

The Ministry of Science, Higher Schools and Technology to whom the mentioned Secretariat is subordinate and which is now supervising information science affairs in Poland, is counting on increased activity in used computers after various economic units pass completely over to a self-financing basis. Thus, in this case, the reform is supposed to perform miracles. But, what mechanisms will bring about the transfer of tens of computer systems located in directors' private offices, even in the Ministry of Science?

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